

## SpaceCube Core Software

Completed Technology Project (2011 - 2015)



## Project Introduction

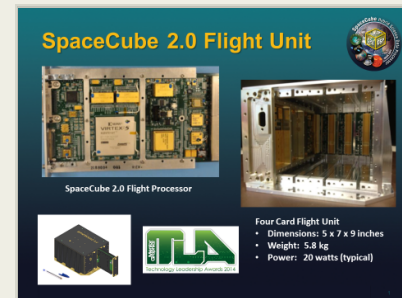
Develop a flexible, modular and user friendly SpaceCube Core Software system that will dramatically simplify SpaceCube application development and enable any SpaceCube application to run on any SpaceCube platform, under any operating system

Free Spacecube application developers from the embedded system details and enable them to work at a higher level, focused solely on their application Task Includes: Define standard software/hardware interfaces and register sets Begin developing generic driver packages to abstract the various SpaceCube hardware platforms from the operating systems Adapt the CFE "O/S abstraction layer" to SpaceCube Linux, capture real-time performance metrics and implement dual PowerPC inter-communication via CFE protocols Collaborators: GSFC Flight Software Branch

## Anticipated Benefits

SpaceCube is a mission-enabling, cross-cutting technology that can support Earth, Space and Planetary Science, robotic servicing, and exploration applications. By marrying commercial radiation-tolerant FPGAs with special upset mitigation techniques SpaceCube delivers reliable on-orbit performance with "order of magnitude" improvements in processing power when compared to traditional flight processors, and has demonstrated 99.99% operational uptime in space.

SpaceCube's processing power enables missions to autonomously detect and react to events, produce data products on-board for applications such as direct downlink, quick look, and "first responder" real-time awareness, enable "sensor web" multiplatform collaboration, and perform onboard "lossless" data reduction by migrating typical ground-based processing functions on-board, reducing on-board storage and downlink bandwidth requirements.



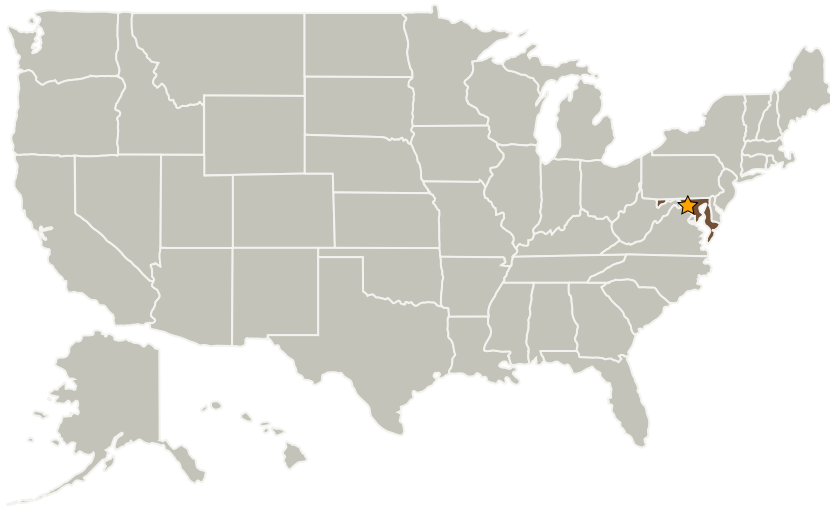
SpaceCube 2.0 Flight Unit

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Goddard Space Flight Center (GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

### Primary U.S. Work Locations

Maryland

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Goddard Space Flight Center (GSFC)

### Responsible Program:

Center Innovation Fund: GSFC CIF

## Project Management

### Program Director:

Michael R Lapointe

### Program Manager:

Peter M Hughes

### Principal Investigator:

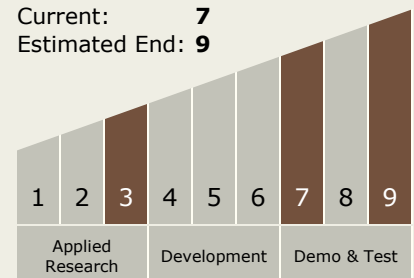
Thomas P Flatley

## Technology Maturity (TRL)

Start: 3

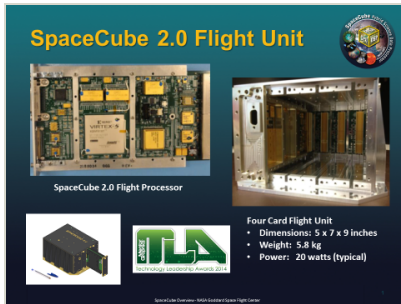
Current: 7

Estimated End: 9





## Images



### SpaceCube 2.0 Flight Unit

SpaceCube 2.0 Flight Unit  
(<https://techport.nasa.gov/image/16602>)

## Links

GSC-16673-1  
(no url provided)

### Project Website:

<http://spacecube.nasa.gov/>

## Technology Areas

### Primary:

- TX02 Flight Computing and Avionics
  - └ TX02.1 Avionics Component Technologies
    - └ TX02.1.3 High Performance Processors